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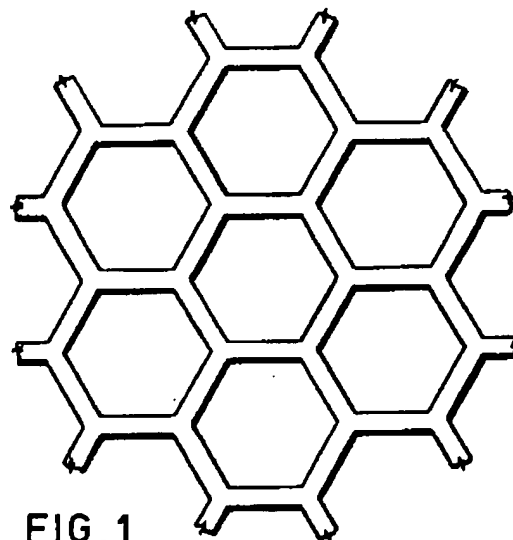
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**(54) Surface covering material**

(57) A surface covering material comprising a sheet of homogeneous flexible material 1 into which an open-meshed net 6 of flexible material has been embedded such that the homogeneous flexible material at least partially fills each mesh defined by the net. The net is visible from the side of the sheet which in use is uppermost. The net introduces a decorative effect to the sheet in the form of a 3-dimensional structure which can be repeatedly cleaned and worn away without the appearance of the product being significantly affected.



**FIG. 1**

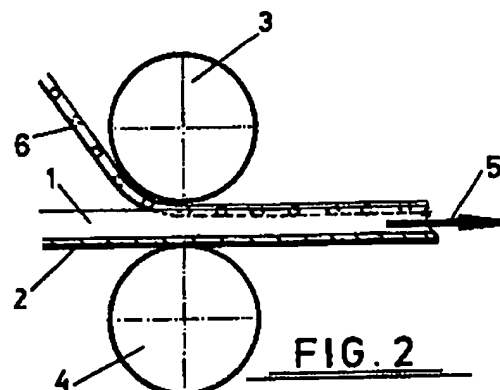


FIG. 2

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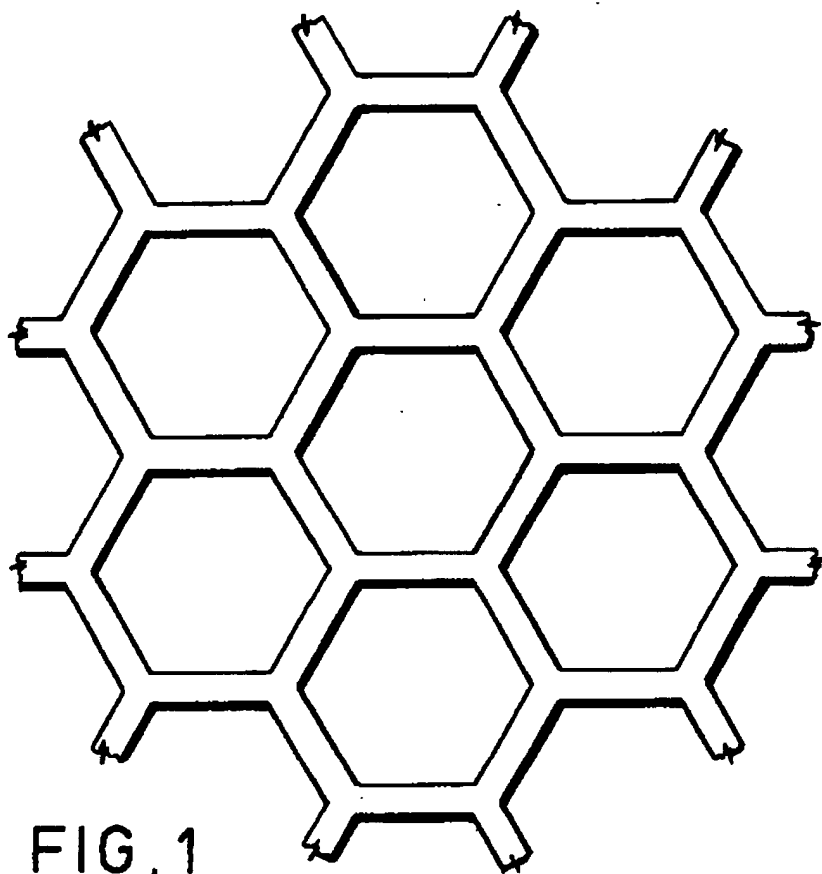


FIG. 1

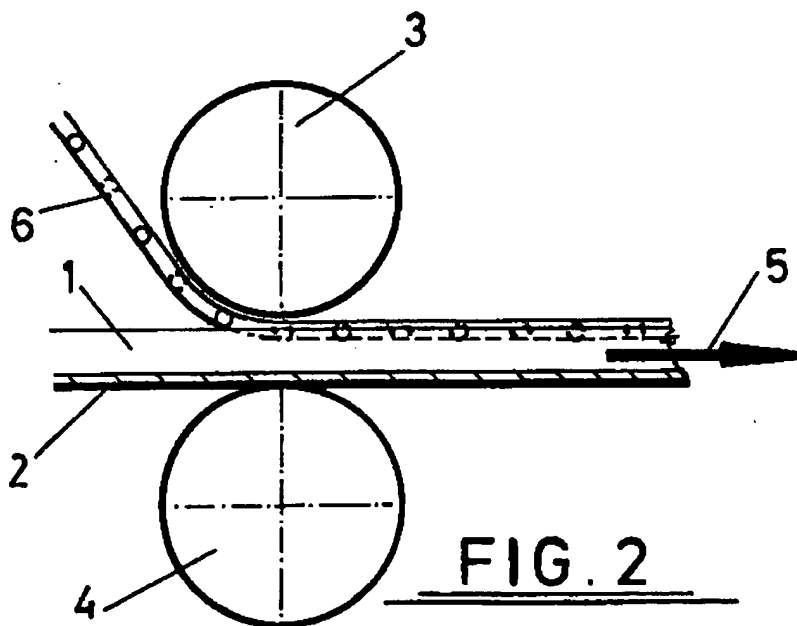


FIG. 2

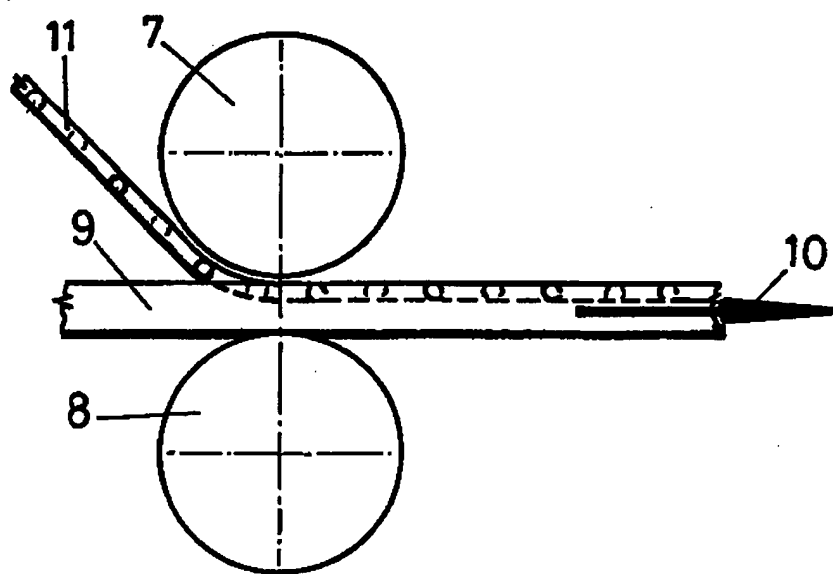


FIG. 3

## SPECIFICATION

### Surface covering material

- 5 The present invention relates to a surface covering material and a method for manufacturing such a material.

Surface covering materials are widely used as for example floor coverings. Known floor coverings are supplied in various grades of quality, durability and price. For domestic applications decorative floor coverings are generally preferred, often comprising a foam backing supporting a vinyl surface. The vinyl surface is generally decorated with an appropriate pattern. As the pattern is a surface treatment on the vinyl however it can easily be damaged or worn away by repeated cleaning. Thus in circumstances where very durable floor coverings are required, for example kitchens or hospitals where heavy traffic and repeated vigorous cleaning are inevitable, vinyl floor coverings with decorative surface wear out too quickly.

25 In situations where more durable floor covering is required it is known to provide a homogeneous sheet of material the visually apparent features of which extends throughout the thickness of the sheet. Thus even if the surface of the sheet is significantly worn away its outward appearance is unaltered. Unfortunately no satisfactory method has been proposed for applying a decorative finish to the known sheet materials which finish extends to a significant depth within the sheet.

In an attempt to improve the appearance of heavy duty floor coverings proposals have been made to produce a sheet of material made up from a backing sheet or carrier on which chips or flakes of a durable material are spread out and subsequently secured in position by infilling with an appropriate composition. This effectively results in a product with the surface pattern extending to a significant depth within the sheet but only at the expense of a relatively complex manufacturing process. Furthermore very careful quality control must be exercised to ensure that no crevices are formed in the structure which crevices could for example make thorough cleaning difficult or impossible.

It has been known for many years to incorporate in a floor covering a carrier of woven material such as hessian the function of which is to form a backing on which a sheet of appropriate material could be supported. Indeed the traditional floor covering product known for decades by the term "linoleum" had such a structure. The carrier did not however significantly affect the visual appearance of the floor covering.

It is an object of the present invention to provide an improved floor covering.

According to the present invention there is provided a surface covering material compris-

ing a sheet of homogeneous flexible material into which an open-meshed net of flexible material has been embedded, such that the homogeneous flexible material at least partially fills each mesh defined by the net, the material of the net being visible from the side of the sheet which in use of the covering material is uppermost.

The invention also provides a method for manufacturing a surface covering material in which a molten or softened sheet of homogeneous material is produced, an open-meshed net of flexible material is pressed into the sheet so as to be embedded therein with the homogeneous flexible material at least partially filling each mesh defined by the net, and the sheet is further processed to permanently retain the net embedded therein with the material of the net being visible from the side of the sheet which in use of the covering material is uppermost.

The present invention thus introduces the concept of adding a decorative effect to a sheet of material not applying a surface coating but rather by applying a 3-dimensional structure embodying the desired decorative features to one side of the sheet and then causing the 3-dimensional structure to be embedded within the sheet. A product produced in this way can be repeatedly cleaned and worn away without the appearance of the product being significantly affected.

The term "open meshed net" is used herein to mean a net which when laid out on a flat surface defines a series of regular or irregular apertures or meshes, the surface area of the meshes being a substantial proportion of the total surface area of the net. An example of a net which can be used to advantage in accordance with the present invention is the integrally moulded PVC or polyethylene netting marketed under the trade name "NETLON" (Registered Trade Mark).

The net may be embedded in the homogeneous material in any convenient manner. For example the net may be rolled into the homogeneous material using a calender roller so as to produce a final product with a flat surface. Alternatively the net may be laid out on a layer of homogeneous material which is simply spread on a carrier membrane, the force with which the net is pressed into the homogeneous material being relatively small. The depth to which the net is embedded in the homogeneous material is a function of the force applied to the net and accordingly if desired the net may project slightly from the surface of the adjacent homogeneous material. The surface of the covering material is thus not smooth and accordingly non-slip characteristics can be imparted to the covering material.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in

which:

*Figure 1* illustrates the basic structure of a net in the form of an integrally moulded thermoplastic suitable for use in accordance with the present invention;

*Figure 2* is a schematic illustration of a device for applying a net to a homogeneous PVC material using a relatively low pressure; and

*Figure 3* schematically illustrates a device for applying net to a homogeneous PVC material under high pressure.

Referring to Fig. 1, the illustrated net comprises a PVC, polyester or other thermoplastic integrally moulded material. The dimensions, configuration and colour of the net will be selected to suit the particular decorative effect which is desired in the end product. In one sample product in accordance with the present invention the size of the meshes or apertures in the net is of the order of a few centimetres, e.g. less than 3 centimetres, and the individual strands of the net are of the order of a few millimetres in thickness and width, e.g. from 0.5mm to 1.75mm in thickness and width.

Referring now to Fig. 2, a homogeneous material 1 which is a mixture of PVC, conventional plasticizers, fillers and additives is spread onto a carrier to which may be of for example a textile material and fed between a pair of rollers 3, 4 in the direction of arrow 5. A net 6 of the type illustrated in Fig. 1 is also fed between the rollers on the side of the carrier adjacent to the roller 3. The gap between the rollers 3 and 4 is such that the net 6 is pressed gently into the surface of the homogeneous material 1 so that most of its bulk is embedded within the material 1 but a small proportion of the net 6 projects above the surface of the surrounding material 1. After leaving the rollers 3, 4 the composite structure is heated so as to fuse the PVC material 1 to the net 6.

The resultant product has an upper surface on which the net 6 is clearly visible and therefore can be used to define a decorative pattern. By control of the colour, configuration and dimensions of the net 6 and the colour of the PVC material 1 a wide range of decorative effects can be achieved. Furthermore the fact that the net 6 projects above the surface of the PVC material 1 by a short distance results in a "dimpled" effect which provides a non-slip finish to the product.

If it is desired to ensure that the surface of the net 6 is contiguous with the surface of the PVC material 1 the product can be rolled under high pressure after leaving the rollers 3 and 4. Alternatively the rollers 3 and 4 can be arranged to apply a very high surface pressure so as to ensure that the net 6 is fully embedded in the PVC material 1.

Fig. 3 shows an alternative arrangement to that of Fig. 2, the arrangement of Fig. 3 com-

prising rollers 7 and 8 between which a PVC homogenized material 9 is drawn in the direction of arrow 10.

The PVC material 9 is of conventional form, for example a blend of PVC resin, plasticizer oils, processing additives, fillers and pigments produced in a conventional internal mixer. The internal mixer heats the blend by friction heating to a temperature of for example 170°C and the resultant dough-like substance is transferred to calender rollers which roll out the sheet 9 shown in Fig. 3. The sheet 9 does not incorporate a carrier. A net 11 is then forced into one surface of the sheet 9 by exerting a high pressure between the rollers 7 and 8, the surface of the net 11 being contiguous with the surface of the sheet 9 within which it is embedded.

Where the net has a regular structure it is important to avoid distortion of the structure as the net is embedded into the homogeneous material. The necessary positional accuracy for individual elements of the net can be achieved by feeding the net to the embedding rollers using a toothed roller individual teeth of which engage respective apertures in the net. Where it is desired to produce a random pattern however by embedding an irregular net the positional accuracy is less important and the greater degree of distortion of the net in the final product may be acceptable.

#### CLAIMS

1. A surface covering material comprising a sheet of homogeneous flexible material into which an open-meshed net of flexible material has been embedded, such that the homogeneous flexible material at least partially fills each mesh defined by the net, the material of the net being visible from the side of the sheet which in use of the covering material is uppermost.

2. A surface covering material according to claim 1, wherein the net is integrally moulded.

3. A method for manufacturing a surface covering material in which a molten or softened sheet of homogeneous material is produced, an open-meshed net of flexible material is pressed into the sheet so as to be embedded therein with the homogeneous flexible material at least partially filling each mesh defined by the net, and the sheet is further processed to permanently retain the net embedded therein with the material of the net being visible from the side of the sheet which in use of the covering material is uppermost.

4. A method according to claim 3, wherein the net is rolled into the homogeneous material using a calender roller so as to produce a final product with a flat surface.

5. A method according to claim 3, wherein the net is laid out on a layer of the homogeneous material which is spread on a carrier membrane, and the net is pressed into the homogeneous material.

6. A method according to claim 5, wherein the net is pressed into the homogeneous material to a depth such that after pressing the net material projects from the surface of the homogeneous material.

7. A surface covering material substantially as hereinbefore described with reference to the accompanying drawings.

8. A method for manufacturing a surface covering material substantially as hereinbefore described with reference to the accompanying drawings.

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